Bridge No. 4666
Minnesota Trunk Highway 19 Spanning Minnesota River
~~Morton Vicinity~~ NORTH REDWOOD VIC.
Redwood County
Minnesota

HAER No. MN-86

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Denver, Colorado 80225-0287

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HISTORIC AMERICAN ENGINEERING RECORD

BRIDGE NO. 4666
HAER NO. MN-86

Location:	Spanning the Minnesota River on Minnesota Trunk Highway 19 in Honner Township, Redwood County, approximately one-half mile southwest of the City of Morton, Renville County.
USGS Quad:	Morton, Minnesota, 7.5 Minute Series
UTM Coordinates:	15:341475.4934290; 15:341430.4934220
Date of Construction:	1927-1928
Engineer:	Minnesota Highway Department
Contractor:	Minneapolis Bridge Company
Fabricator:	American Bridge Company
Present Owner:	Minnesota Department of Transportation
Present Use:	Vehicular highway bridge
Significance:	Completed in 1928 according to standardized plans of the Minnesota Highway Department (MHD), Bridge No. 4666 consists of a riveted high Parker truss and two riveted low Warren trusses. Replacing an antiquated bridge with treacherous approaches, Bridge No. 4666 was part of a general realignment of a dangerous portion of the state's original trunk highway system. The MHD considered the project to be an excellent example of its commitment to improving those highways under its jurisdiction.
Project Information:	The Minnesota Department of Transportation (Mn/DOT) wishes to realign the route of Minnesota Trunk Highway 19 immediately southwest of Morton, Minnesota. This project will replace Bridge No. 4666, declared eligible for the National Register of Historic Places by the Minnesota Historic Preservation Office (SHPO) in 1994. To mitigate the adverse impact on Bridge No. 4666, Mn/DOT agreed to document the structure according to the Standards of the Historic American Engineering Record (HAER). The HAER study was completed in 1996 by the historical consulting firm of Hess, Roise and Company, Minneapolis. Jeffrey A. Hess served as Principal Investigator and Project Historian; Jerry Mathiason, as Project Photographer. The historical narrative incorporates text by Patrick Nunnally, a principal investigator of a prior historical study of the bridge conducted by the Minnesota Historical Society.

Euro-American settlement of the Redwood Falls Area[1]

According to Minnesota geographer Warren Upham, the southwestern Minnesota county of Redwood and its administrative seat, Redwood Falls, derive their name from the Redwood River, which in turn owes its appellation to a number of possible sources. The river may have become known as "redwood" from the slender bushes that provide the smoking additive known to Native Americans as "kinnikinnick," or perhaps from the red cedar trees that grew at the falls of the river. Still another story has it that early settlers saw a number of trees that had been painted red, presumably as an orienting device by Native people.[2] Euro-American homesteaders entered the region in the 1850s, often taking advantage of the Minnesota River Valley, which carves Redwood County's northern border. Many traveled at least part of the way by steamboat, boarding at St. Paul and disembarking about 100 miles upstream at Mankato, beyond which the Minnesota River was usually too shallow and snag-ridden for reliable navigation. Others journeyed overland the entire distance, driving oxen, horse, and wagons along old fur-trade trails that intersected and occasionally merged with new government roads built in the mid-1850s through the Minnesota River and Cottonwood River valleys. This influx came to an abrupt halt with the outbreak of the Dakota War of 1862, which effectively depopulated the countryside. Within a few years, however, settlers returned, this time to stay. The site that later became the town of Redwood Falls was claimed in the spring of 1864, with formal town platting following two years later.[3]

Settlement in the early decades followed a consistent pattern across southern Minnesota and the upper Midwest. Farmers and land speculators dominated the first wave of emigration, with the latter hoping to develop "paper towns," and lure additional settlers with promises of metropolises to come. Some of these towns actually appeared, while others never made it past the dream stage. A dispersed settlement pattern developed, as farmers gradually filled in the arable land and small villages grew up to serve as trade centers for the local agricultural

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[1] This section incorporates text and ideas originally conceived by historian Patrick Nunnally for David Mather and Patrick Nunnally, "Draft Cultural Resources Reconnaissance Survey and Property Evaluation Report," vol. 1, prepared by the Trunk Highway Cultural Resources Program, Minnesota Historical Society (MHS) under a cooperative agreement between the Minnesota Department of Transportation (Mn/DOT), Federal Highway Administration, U.S. Department of Transportation, and MHS, Octoher 1994, 26-28; see Compliance Referral File No. 90-116, in State Historic Preservation Office (SHPO), MHS.

[2] Warren Upham, *Minnesota Geographic Names. Collections of the Minnesota Historical Society*, vol. 17 (St. Paul: Minnesota Historical Society, 1920), 448.

[3] Franklin Curtiss-Wedge, *History of Redwood County*, vol. 1 (Chicago: H.C. Cooper Jr. and Co., 1916), 219-223; Artbur J. Larsen, "Roads and the Settlement of Minnesota," *Minnesota History* 21 (September 1940): 226-228; Theodore Blegen, *Minnesota: A History of the State* (Minneapolis: University of Minnesota Press, 1975), 189-192; Rhoda R. Gilman and otbers, *The Red River Trails* (St. Paul: Minnesota Historical Society, 1979), 47-52; W.E. Webb and J.I. Swedberg, *Redwood: The Story of a County* (Redwood Falls: Redwood County Board of Commissioners, 1964), 120-124.

economy. After the Winona and St. Peter Railroad laid tracks through the region in 1872, the flow of people and freight was generally by rail, moving east-west across the southern part of the county. In 1878, a branch line reached north to Redwood Falls, tying the county seat into the national railroad network.[4] Travel north of Redwood Falls, however, remained a cumbersome and sometimes hazardous proposition, as "the only way to cross the Minnesota River between Redwood and Renville counties was by ferry or ford, or on the ice in winter."[5] It was not until 1885 that traffic between Redwood Falls and its Renville County neighbor, Morton, was able to cross the Minnesota River on a bridge, erected at North Redwood Falls for approximately $5,000. Other bridges soon followed, including one slightly upstream near Delhi and one slightly downstream near Morton. These improvements both facilitated and reflected a surge in the county's population. By 1900, virtually all the county's arable land had been claimed; by 1900, seven bridges spanned the Minnesota River between Redwood and Renville counties.[6]

Standardization of Minnesota Highway Bridges

At the turn of the century, most highway bridges in Redwood County were relatively lightweight structures built with township or county money, without professional engineering assistance, on poorly maintained dirt roads. Travel was slow, and bridge failures were common. Similar conditions prevailed throughout Minnesota and much of the nation, eventually triggering a broad-based effort at highway reform, known as the "Good Roads Movement." In 1905, Minnesota Good Roads enthusiasts achieved an important part of their program when the state legislature established the Minnesota Highway Commission (MHC) to develop highway engineering standards for the state.[7] After assessing the bridge situation, the MHC in 1908 reported to the legislature that "one great defect in our highway system is in the peculiar method of contracting for bridges without the advice or assistance of a bridge engineer well posted in such matters, and allowing such bridges to be built without any supervision."[8]

The prevailing method was for township and county officials to solicit bids from private bridge-building companies, which submitted proposals based on their own designs. As one highway reformer noted: "Since there is no uniformity in the plans, there is no real basis for comparison of the bids." Having little knowledge of engineering themselves, the local officials

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[4] Curtiss-Wedge, 222.

[5] Webb and Swedberg, 361.

[6] Ibid., 361, 364-365.

[7] Robert M. Frame III, "Historic Bridge Project," prepared for SHPO and Mn/DOT, 1985, 15-16, 20-22, in SHPO files, MHS, St. Paul.

[8] State Highway Commission of Minnesota, *Second Annual Report, 1908* (Minneapolis: Pedersen Linotyping Co., n.d.), 62.

looked to the bidders for guidance, and each, of course, attempted "to convince them that his particular plan is the happy combination of price with value." In the eyes of the engineering profession, "The result of these 'explanations' is generally to confuse rather than to explain and to leave the officers less able to render good judgment than before hearing them."[9] In Meeker County, situated just north of Renville County, the county officials became so frustrated with the process that they urged the MHC to establish specific rules for bridge design:

> The County Board is often at a great loss in deciding on the relative merits of the many different plans of bridges with their accompanying detailed specifications as submitted by the numerous bidders who appear and offer each a different plan from which only a competent bridge engineer, after a thoro [sic] examination could select the best for the money asked. . . . It is the opinion of this Board that the proper solution of the question would be for the state to adopt a set of standard plans and specifications for all bridges . . . to be furnished free on request to the several counties.[10]

In 1908, the MHC began circulating standardized bridge plans to local governments. The use of these plans was largely voluntary. Since the state's designs tended to call for sturdier -- and therefore more expensive -- construction than that offered by the bridge-building companies, the new plans were often ignored. In 1913, however, the state legislature increased the MHC's regulatory reach by approving a highway reform act known as the Dunn Law. This legislation required local governments to provide prospective bidders with a uniform set of plans and specifications for any bridge project exceeding $500. It also required the MHC to furnish such plans upon request and to inspect the construction upon completion.[11] As a result, the MHC's design standards soon governed bridge building in Minnesota. Only one year after the passage of the Dunn Law, the agency reported that "to meet the demand for plans . . . the bridge department has prepared 84 standard plans . . . for spans varying from 10 to 190 feet." The designs covered "beam spans, plate girders, low trusses and high trusses, [and] reinforced concrete slab and girder bridges."[12]

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[9] M.W. Torkelson, "Highway Bridges," *Proceedings of the Second Annual Meeting of the Engineering Society of Wisconsin* (Madison: State Journal Printing Co., 1910), 121-122. Although the author is criticizing Wisconsin practices, the system was the same in Minnesota; see L.P. Wolff, "Highway Bridges," *Bulletin of the Affiliated Engineering Societies of Minnesota* 1 (December 1916): 211.

[10] Resolution of the Meeker County Board, 13 March 1908, in Meeker County Folder, 1906-1912, Minnesota Highway Department Collection, Minnesota State Archives, MHS.

[11] For the Dunn Law's provisions on bridge construction, see *Report of the State Highway Commission of Minnesota, 1914* (N.p., 1915), 222-223; Frame, "Historic Bridge Project," 24-26.

[12] *Report, 1914*, 222.

The Minnesota Trunk Highway System

Although the Dunn Law tightened the MHC's control over highway bridges, the state still had relatively little to say about the selection, design, construction, and maintenance of the highways themselves. Whatever supervision it did exercise was limited to what were called "State Roads," an inter-county highway network authorized in 1905 by the same law that set up the MHC. Although the administrative details varied from year to year, the MHC was responsible for preparing plans and specifications and for approving construction on State Road projects, which were subsidized by state and county funds according to various matching arrangements. However, the designation of State Roads, as well as the character of the proposed improvements, rested in each county with the county board of supervisors, who often were more interested in creating political good will than in building an efficient highway system.[13] As the MHC noted in its biennial report for 1909-1910: "One of the greatest difficulties . . . comes from a desire on the part of the county boards to accommodate all portions of their jurisdiction, and thus to designate so great a mileage as to make it practically impossible to distribute the small fund allotted to them in sufficient amounts to accomplish any tangible results."[14] Other observers were more blunt: "State roads were permitted to be designated by county boards regardless of the possibility of construction. . . . This resulted in a large mileage of disconnected and aimless state roads leading no-where and in a great many cases being the poorest roads in the county."[15]

When the MHC first took up its duties, there were barely 3,000 automobiles on Minnesota highways. By 1916, the number had grown to 134,000. The same upward trend held true for the nation. Partly in response to the growing automobile lobby, Congress in 1916 passed legislation encouraging states to establish highway authorities for the purpose of creating and administering a national network of well-engineered main roads. The Federal-Aid Road Act, as it was called, made $75 million of construction monies available on a match basis over a five-year period. Partly to qualify for this federal largesse, the Minnesota State Legislature in 1917 reorganized the MHC as the Minnesota Highway Department (MHD), replacing the three part-time commissioners of the original agency with a full-time salaried administrator. The new office of State Highway Commissioner was occupied by Charles M. Babcock, a long-time

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[13] State Highway Commission of Minnesota, *Additional Rules and Regulations for the Construction and Improvement of State Roads. Bulletin No. 5* (N.p.: The State Highway Commission, 1910); *Report of the State Highway Commission of Minnesota, 1912-1913* (N.p., n.d.), 7; J. H. Mullen, "Highway Laws," *Proceedings of the Minnesota Surveyors' and Engineers' Society* (February 1914): 27-33.

[14] *Report of the State Highway Commission of Minnesota, 1909-1910* (N.p, n.d.), 17. See also *Report, 1912-1913*, 10.

[15] Mullen, 27.

advocate of state-controlled arterial roads who had served on the MHC since 1911.[16]

Babcock immediately set to work revamping Minnesota's ineffectual State Road network into a well-integrated system of main, or "trunk," highways that linked all county seats. In 1919, Babcock presented his program to the legislature, which placed the issue before the electorate in the form of a constitutional amendment. After heated debate, the new highway code was approved by Minnesota voters in the fall of 1920, and went into effect the following year. Under the Babcock Plan, the state took complete control of 70 routes encompassing approximately 7,000 miles of road.[17] Although the Babcock Amendment named the routes through the various counties, it did not describe the exact locations. The MHD's first task was to mark temporary routes, which would later be improved by grading, widening, surfacing, and, in some cases, realignment and total new construction. As Babcock himself explained, the selection of these temporary routes usually followed "certain main traveled roads . . . which were generally accepted as the logical location for the trunk highways. These were generally state aid roads, with more or less improvement."[18] In Redwood and Renville counties, for example, the former route of State Road No. 1 became the original route of the new Trunk Highway (T.H.) No. 4, connecting the two county seats (Redwood Falls and Olivia) by way of Morton and the existing Minnesota River bridge near Morton.[19]

Unlike some trunk highways, which extended only a few miles between adjacent county seats, T.H. 4 was truly a main arterial road. Running from the Iowa border near Jackson, Minnesota, to the American-Canadian bridge at International Falls, Minnesota, the highway traversed the entire state, passing through the heart of the north-woods resort region.[20] During the tourist season, traffic out of Iowa was considerable, and it tended to bottle-neck at Redwood Falls. There were two main reasons for the congestion. First, the three-mile stretch between

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[16] Minnesota Highway Department, *History and Organization of the Department of Highways* (St. Paul: Minnesota Highway Department, 1948), 57; Arthur J. Larsen, *The Development of the Minnesota Road System* (St. Paul: Minnesota Historical Society, 1966), 439-469; "Roads, Streets, and Highways," *History of Public Works in the United States, 1776-1976*, ed. Ellis L. Armstrong and others (Chicago: American Puhlic Works Association, 1976), 78.

[17] *Minnesota Highways and the Babcock Good Roads Plan* (Minnesota Highway Department, ca.1927), 5-10.

[18] Charles M. Bahcock, "The State Trunk Highways of Minnesota," *Minnesota County Commissioner* (April 1927): 14.

[19] Curtiss-Wedge, 228-229; *The McGary Bill Submitting Good Roads Amendment No. 1, the Babcock Plan to Amend the Constitution of Minnesota to Establish a State Trunk Highway System* (St. Paul: Minnesota Highway Improvement Association, Inc., 1920), 4.

[20] For a layout of the trunk highway system, see "Minnesota Trunk Highways Improvement Progress Map," 1 February 1925, in *Biennial Report of the Commissioner of Highways of Minnesota, 1925-1926* (Minneapolis: Syndicate Printing Co., 1927), frontispiece.

Redwood Falls and Morton was, to quote the local press, "one of the most objectionable pieces of road in the state," containing steep grades, dangerous railroad crossings, "bad curves," and an "old bridge across the Minnesota River with . . . sharp turns at the approaches."[21] Second, the Redwood Falls-Morton road did double duty in the trunk highway system. At Redwood Falls another trunk highway, east-west T.H. 14, merged with T.H. 4 to cross the Minnesota River. In Morton, the two routes parted company, T.H. 4 continuing north to Olivia, and T.H. 14 turning east to Gaylord, the seat of neighboring Sibley County. The traffic problems in the area apparently increased in the mid-1920s, when the U.S. Bureau of Roads, in cooperation with the MHD, selected T.H. 4 to be part of a new national system intended to serve "a heavy interstate traffic." In its new identify as "U.S. Highway No. 71," T.H. 4 became the northern end of a tourist pipeline stretching to Baton Rouge, Louisiana. In 1927, traffic over the Morton bridge reached an average of 643 cars per day, double the level of six years earlier.[22]

Design of Bridge No. 4666

In the spring of 1927, the MHD signaled its intention to improve the roadway between Redwood Falls and Morton. "It is understood," announced the *Morton Enterprise*, "that the plans . . . contemplate a steel and concrete bridge upstream from the present bridge over the [Minnesota] river."[23] The project also called for a major realignment of the route, extensive excavation and filling, and the construction of other bridges in the flood plain immediately west of the river (see Figure 1). Officially designated as Bridge No. 4666, the new river crossing was to be the largest of the proposed structures, measuring approximately 290 feet in length. Final drawings for the bridge, prepared by MHD staff engineers in August 1927, show a multiple-span structure consisting of two 65-foot approach spans on the north end and a 160-foot main span on the south end.[24] In terms of general design, the three spans conformed to the MHD's latest guidelines for trunk highway bridges. Published in 1925, these specifications dictated that "for spans 40 to 80 feet inclusive, use low riveted [steel] trusses of Warren type

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[21] "Minnesota River Bridge Completed," *Morton Enterprise*, 30 August 1928. See also "Highway Department to Rebuild No. 4 and 14," *Redwood Gazette*, 8 June 1927.

[22] At least 14 Minnesota routes were incorporated into the U.S. interstate system, a larger number than was assigned to the average state. According to the MHD: "That Minnesota was thus favored was partially due to the general recognition of this state's rapidly increasing tourist traffic. But the main reason was that Minnesota was in advance of most of the other states in developing through routes; marking, maintaining and improving them in such a manner that the interstate tourist is assured of a continuous and uniformly good road through the state"; *Biennial Report, 1925-1926*, 16. For traffic statistics on the Redwood Falls-Morton stretch, see "Get Road Where It Belongs, First Aim," *Redwood Gazette*, 28 March 1928.

[23] "River Bridge Plans Near Completion," *Morton Enterprise*, 7 April 1927.

[24] Minnesota Department of Highways, Drawings for Bridge No. 4666, Six Sheets, 16 August 1927, microfilm, Bridge Division, Mn/DOT, Roseville, Minnesota.

with concrete floor . . . [;] for spans of 90 feet and over, use high riveted [steel] trusses of the Pratt type with concrete floor."[25]

Both the Warren and Pratt designs were venerable truss types, dating back to the mid-nineteenth century. The Warren configuration incorporated a series of equilateral triangles, with the diagonal members subject to both compressive and tensile forces. In low Warren trusses, which lacked overhead bracing, the truss webs were often stiffened with vertical members both at the apex of the triangles and at the panel points. This arrangement was commonly employed by the MHD, and it appears in the final drawings for Bridge No. 4666. In the Pratt truss, vertical and diagonal members fulfilled different functions, with the former primarily resisting compressive forces and the latter, tensile forces. Although the type never lost this defining characteristic, it did experience various modifications that gave birth to several "Pratt-type" variants. The most significant was the Parker truss, invented by Bostonian Charles H. Parker about 1870. Parker adapted the Pratt truss by replacing its standard horizontal top chord with a polygonal, or "curved," top chord.[26] As bridge historian James L. Cooper has observed, the result was a cheaper and more efficient design especially suited for long spans:

> Longer spans require more distance between the two [ie., bottom and top] chords. By inclining some or all sections of the top chord in arch-like fashion, the designer increases the distance between the upper and the lower chord and makes the truss depth the greatest at center span where the stresses reach their maximum. The depth does not need to be as great toward span-end where the stresses are smaller. By adjusting the height of the top chord's segments for expected load, the polygonal chord uses significantly less metal than a horizontal one which maintains a constant truss depth set to accommodate the truss segments carrying the greatest loads.[27]

For several decades after 1890, Parker's curved top chord figured prominently in the long-span, Pratt-type bridges designed by American railroad and highway engineers. For example, when the MHC issued its first comprehensive set of bridge specifications in 1912, it mandated high trusses "with inclined top chords" for spans over 140 feet. When reissued in 1918, 1921, and 1925, the specifications merely stipulated "Pratt type" high trusses for long

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[25] Minnesota Highway Department, *Minnesota Highway Department Trunk Highway Standard Specifications* (N.p., 1925), 1.

[26] For brief histories of the Warren and Pratt trusses, see Carl W. Condit, *American Building* (University of Chicago Press, 1982), 93-101. On the Parker truss, see Mansfield Merriman and Henry S. Jacoby, *A Text-Book on Roofs and Bridges, Part 1, Stresses in Simple Trusses* (New York: John Wiley and Sons, 1909), 212, 238.

[27] James L. Cooper, *Iron Monuments to Distant Posterity* (N.p.: DePauw University and others, 1987), 44.

spans, with the understanding that the Parker configuration would be employed as necessary.[28] It was, therefore, a routine decision for the MHD to design the 160-foot main span of Bridge 4666 as a through Parker truss. In its detailing, the eight-panel arrangement of the main span reflected MHD's standardized plan for through trusses of comparable length. Single or double sets of paired angle sections, tied with either batten plates or V-lacing, comprised most web members, except for the upper chord, which consisted of two channel sections tied by a cover plate and X-lacing. Web bracing was somewhat lighter, employing single-angle configurations (with paired-angle struts) for top lateral, overhead sway, and portal bracing. While such bracing was customary for overhead Pratt trusses, the main span of Bridge No. 4666 also incorporated angle-section intermediate horizontal struts in the four central panels, thus providing special stiffening for the Parker truss's deeper web.

MHD standardized plans also governed the design of Bridge 4666's two identically configured, eight-panel, Warren truss approach spans; reinforced concrete substructure; and expansion bearings (rocker types under the north ends of the approach spans; roller type under the south end of the main span).[29] Similarly, the bridge's flooring system was completely conventional, with reinforced concrete decking resting on rolled I-beam stringers and rolled I-beam floor beams. Only the bridge's 27-foot-wide roadway might have caused comment among highway engineers from other states. As the MHD noted in its Biennial Report for 1929-1930:

> Minnesota is one of the relatively few states which, during the past few years, has consistently designed and built so-called wide roadways on its bridges over the entire Trunk Highway System. A number of states still continue to build bridges with 18-foot and 20-foot widths, which while adequate as to strength requirements, are manifestly too narrow for public safety, particularly for night traffic. The customary bridge widths used in our state vary in general, from a minimum of twenty-four to forty feet clear roadway.[30]

Construction of Bridge No. 4666

In September 1927, the MHD awarded a construction contract for Bridge No. 4666 to the Minneapolis Bridge Company, which placed an order for the structural steel with the Minneapolis office of the American Bridge Company. Fabrication began immediately, and

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[28] Minnesota State Highway Commission, *Standard Specifications for Steel and Concrete Highway Bridges. Bulletin No. 9* (N.p., 1912), 6; State Highway Department of Minnesota, *General Provisions and Bridges and Culvert Specifications* (N.p., 1918), sec. 123, n.p.; Minnesota Highway Department, *Trunk Highway Specifications*, sec. 11, 1.

[29] As was true for the main span, the detailing of the approach spans relied on single and double sets of paired angles, except for the upper chord, which consisted of two channels tied with a cover plate and X-lacing.

[30] *Biennial Report of the Commissioner of Highways of Minnesota, 1929-1930* (Minneapolis: Syndicate Printing Co., 1931), 11.

construction followed apace, with Minneapolis Bridge pouring footings for the north abutment in November 1927. In January 1928, concrete work moved to the south abutment. A month later, MHD's inspector for the project noticed that the contractor was disregarding the agency's usual concrete-mixing specifications. In reporting the incident, he declared, "I cannot see how this company gets by with this kind of work -- as they suggest, they need no inspector." The inspector was probably chagrined to learn that, on the day in question, Minneapolis Bridge had been carrying out an experimental pour to enable MHD engineers to test the strength of drier-than-usual concrete. Apart from this misunderstanding, construction ran smoothly and on schedule. On 30 August 1928, the *Morton Enterprise* announced that "this week marks the completion of the new bridge across the Minnesota River which will form a connecting link in the re-routing of trunk highways Nos. 4 and 14 between Redwood Falls, Morton, and Olivia." The bridge, however, was not quite ready for traffic. Although the substructure and steel work were in place, portions of the roadway had not yet been graded and graveled, including the bridge's approaches. Scheduled under another contract, this work was completed in December 1928 by Stanley Brothers of St. Cloud, Minnesota. The final construction of the three spans and approaches conformed to the MHD's original design.[31]

The Redwood-Morton road realignment was considered a major success of the state's trunk highway program. In 1928, MHD highway construction engineer O.L. Kipp highlighted the project at a meeting of Minneapolis engineers "to show the savings to car owners through proper location of roads carrying heavy traffic." As reported by the *Redwood Gazette*: "Mr. Kipp pointed out [that] the [original route's] distance had been reduced one mile, [and] there were 13 turns and one railroad crossing eliminated." The MHD also gave the project good coverage in its biennial report for 1927-1928, emphasizing once again the elimination of dangerous railroad crossings and the general improvement of roadway grade and alignment.[32]

As the result of trunk highway renumbering, Bridge No. 4666 now carries T.H. 19 instead of T.H. 4 and 14, although its federal designation as U.S. Highway 71 has remained the same. The bridge also has experienced a few structural modifications. To improve vertical clearance for truck traffic, the MHD in 1960 raised the main span's portal bracing by about five feet and its overhead sway bracing by about two feet. In 1978, the structure also received a new concrete deck, which eliminated the original concrete curbing along the roadway. In its defining truss chracteristics, however, Bridge No. 4666 still embodies its original design.[33]

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[31] "Minnesota River Bridge Completed," *Morton Enterprise*, 30 August 1928; "Final Work on Roads Here," *Morton Enterprise*, 6 December 1928. Our discussion is based on Mather and Nunnally (pp. 72-73) and documents in Bridge No. 4666 File, Central Bridge Storage Files, Mn/DOT, St. Paul.

[32] "Get Road Where it Belongs," *Redwood Gazette*, 28 March 1928; *Biennial Report of the Commissioner of Highways of Minnesota, 1927-1928* (Minneapolis: Syndicate Printing Co., 1929), 10.

[33] Minnesota Department of Highways, Plans for Portal and Sway Frame Revision for Bridge No. 4666, 2 Sheets, 16 September 1958, microfilm, Bridge Division, Mn/DOT. Maintenance records indicate that these revisions occurred in 1960; see Bridge No. 4666 File. On the 1978 remodeling, see Gene Setrum to G. Joseph Hudak, 28 December 1994, S.P. 6406-26 (TH19-71) File, Pre-Design Liaison Unit, Mn/DOT, St. Paul.

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